Office of Energy Efficiency and Renewable Energy

Automotive Fuel Cell Technologies from DOE National Laboratories

Clean-Up System Reduces Carbon Monoxide Concentrations from 10,000 to 50 ppm for Fuel Cell System

Background

The U.S. Department of Energy (DOE) national laboratories are working with industry partners to develop technologies that overcome critical barriers to automotive fuel cell development. These technologies include

- Low-cost, high-performance fuel-cell stack components
- Efficient, low-cost onboard fuel processing technology
- Reduced fuel-cell component size, weight, and cost

Accomplishments

Los Alamos National Laboratory

- Developed fabrication processes for fuel cell membrane-electrode assemblies
  - Reduced platinum loading decreases cost of catalyst by 90%
  - Increased tolerance to impurities that may be in fuel stream
  - Being evaluated and licensed by several fuel cell developers
- Developed carbon monoxide clean-up device
  - Integrated with gasoline fuel processor developed by Arthur D. Little and stacks by Plug Power

Argonne National Laboratory

- Developed fuel-processing technology for methanol-powered fuel cell systems
  - Transferred to General Motors for scale up and integration into its fuel cell development effort
  - Applied technology to gasoline fuel processing at bench scale

Lawrence Berkeley National Laboratory

- Discovered that a new platinum alloy demonstrated the highest tolerance to carbon monoxide in a proton-exchange (PEM) fuel cell of any material yet investigated.

Pacific Northwest National Laboratory

- Demonstrated a full-scale gasoline vaporizer, based on microchannel technology, that is one-tenth the size of conventional fuel vaporizers. This technology will help reduce the size and weight of on-board fuel processing systems.

Benefits

- Fuel cell technologies will enable highly efficient, low- or zero-emission, cost-competitive, fuel-flexible vehicles.
- Laboratory technology is transferred to U.S. supply base.

Future Activities

- Develop low-cost components necessary for the system to be competitive.
- Develop high-volume manufacturing methods.
- Improve fuel processor technology to meet vehicle cost, start-up, and transient response requirements.

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